

Transformations of Quadratics

GRADE 10

$$y = a(x - h)^2 + k$$

If: $|a| > 1$ Vertical Stretch
(graph gets narrower)

$|a| < 1$ Vertical Compression
(graph gets wider)

$a < 0$ Reflection in x-axis
(graph opens down)

If: $(x - h)$
Graph moves right
 h units

$(x + h)$
Graph moves left
 h units

If: $+ k$
Graph moves up
 k units

$- k$
Graph moves down
 k units

Transformations of Quadratics

GRADE 11

$$y = a(k(x - d))^2 + c$$

If: $|a| > 1$ Vertical Stretch
(graph gets narrower)

$|a| < 1$ Vertical Compression
(graph gets wider)

$a < 0$ Reflection in x-axis
(graph opens down)

If: $|k| > 1$ Horizontal Compressions
(graph gets wider)

$|k| < 1$ Horizontal Stretch
(graph gets narrower)

$k < 0$ Reflection in y-axis

If: $(x - d)$
Graph moves right d units

$(x + d)$
Graph moves left d units

If: $+ c$
Graph moves up c units

$- c$
Graph moves down c units

Transformations of Functions

GRADE 12

$$y = a(k(x - d))^n + c$$

If: $|a| > 1$ Vertical Stretch
(graph gets narrower)

$|a| < 1$ Vertical Compression
(graph gets wider)

$a < 0$ Reflection in x-axis
(graph opens down)

If: $|k| > 1$ Horizontal Compressions
(graph gets wider)

$|k| < 1$ Horizontal Stretch
(graph gets narrower)

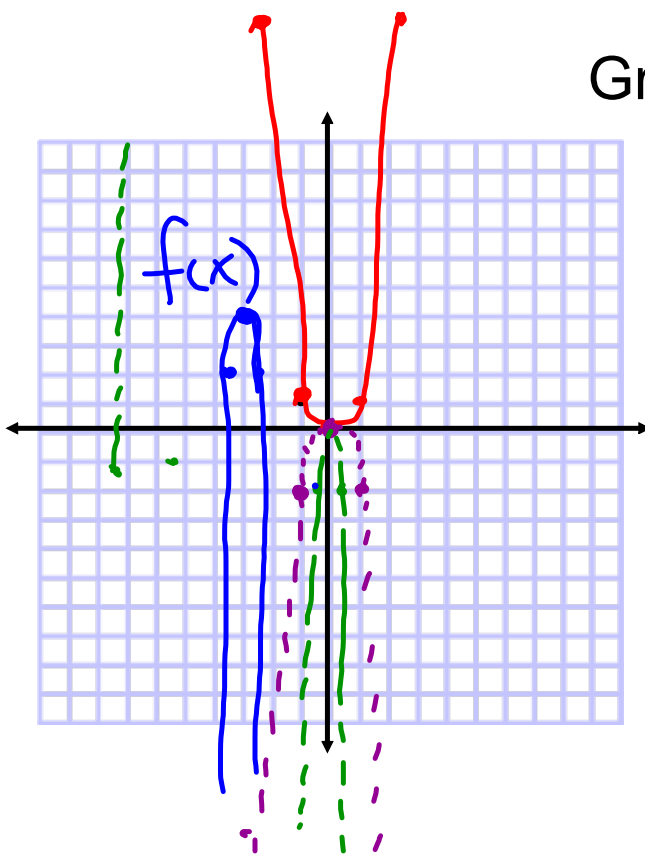
$k < 0$ Reflection in y-axis

If: $(x - d)$
Graph moves right d units

$(x + d)$
Graph moves left d units

If: $+ c$
Graph moves up c units

$- c$
Graph moves down c units



$$\text{Graph } y = -\frac{1}{2} (2(x + 3))^4 + 4$$

base $f(x) = x^4$

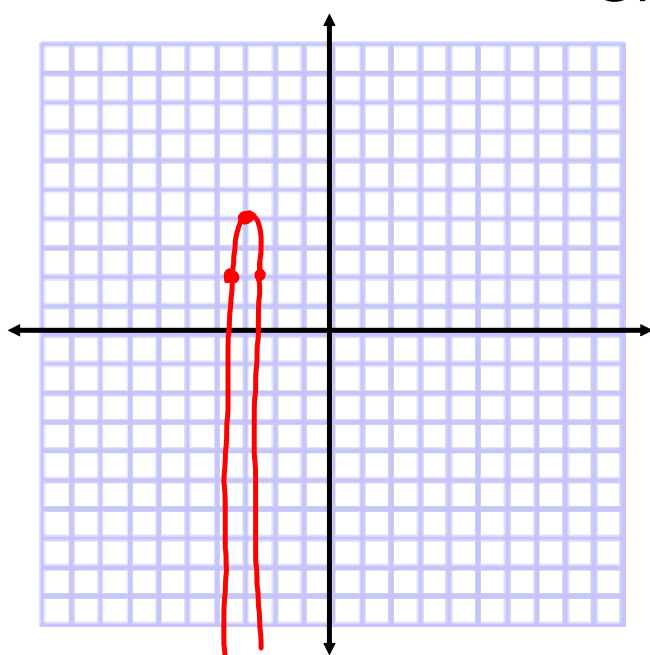
x	y
-2	16
-1	1
0	0
1	1
2	16

- ① flips in x -axis
stretch by a factor of 2
- ② H. Compression by 2
- ③ left 3
- ④ up 4

Graph $y = \textcircled{-2}(\textcircled{2}(x + \textcircled{3}))^4 \textcircled{+ 4}$

mapping notation

$$(x, y) \rightarrow \left(\frac{x}{2} - 3, -2y + 4 \right)$$



x	y	
-1	1	
0	0	→
1	1	

$\frac{x}{2} - 3$	$-2y + 4$
-3.5	2
-3	4
-2.5	2

Homework
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